

Optimized Steganographic Techniques for Secure Information Concealment

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Abstract: *This study presents an enhanced version of the least significant bit (LSB) replacement algorithm for steganography, employing character sequence optimization to boost efficiency and security in data embedding. Operating in the spatial domain, the algorithm involves two main phases: metadata generation and header embedding in the cover image's initial bytes, followed by optimized secret message processing. This optimization minimizes space utilization for the secret text within the cover image, resulting in superior stego image quality compared to conventional LSB methods.*

Our method achieves a high-capacity embedding rate by optimizing the secret message and enhancing security through preprocessing. Comparative evaluations against the standard LSB algorithm, utilizing metrics like PSNR, MSE, and RMSE, affirm its superiority in secret text embedding within cover images. With its potential for secure data transmission, especially in image and video sharing platforms, this enhanced LSB replacement algorithm could significantly bolster communication network security.

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